PATENT SPECIFICATION (11) 1 568 510

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(21) Application No. 10598/76 (22) Filed 16 Mar. 1976
(23) Complete Specification Filed 4 Mar. 1977
(44) Complete Specification Published 29 May 1980
(51) INT. Cl.[3] D21H 5/10
(52) Index at Acceptance
B2E 1725 404S 436T 509T 509U M

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(19)

(54) IMPROVEMENTS IN AND RELATING TO INFORMATION-STORAGE MEDIA

(71) We, RACAL-ZONAL LIMITED, a British Company, of Western Road, Bracknell, Berkshire, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which is to be performed, to be particularly described in and by the following statement:-

This invention relates to information storage media.

According to the invention, there is provided an information storage medium, comprising a sheet of paper, a magnetic coating formed over the whole of one surface of the paper sheet, and a masking coating formed over the magnetic coating, the magnetic coating and masking coating respectively serving to store information in a magnetically readable and an optically readable manner.

According to the invention, there is also provided an information-storage medium, comprising a sheet of paper, a magnetic coating formed over the whole of surface of the paper sheet for magnetically storing information, and an opaque masking coating formed over the whole of one surface of the magnetic coating, the magnetic coating and the masking coating being formed by layers which have been successively applied to the paper sheet.

According to the invention, there is further provided a method of producing an information-storage medium, comprising the steps of coating magnetic particles in a settable liquid binder onto a sheet of paper, setting the binder to form a solid, flexible, magnetic coating over the whole of one surface of the paper sheet, and applying a flexible, opaque, masking coating over the whole of one surface of the magnetic coating.

An information storage medium embodying the invention, and a method employing the invention of producing an information storage medium, will now be described, by way of example, with reference to the accompanying diagrammatic drawing, the sole Figure of which is a cross-section of part of the storage medium.

As shown in the Figure, the storage medium comprises a substrate 1 carrying a magnetic coating 2. A masking coating 3 is applied over the coating 2 and comprises an opaque layer 4 and a clear protective layer 5. The relative thicknesses of the substrate 1 and coatings 2 and 3 are not shown to scale.

The substrate 1 is a thin flexibe paper sheet.

The magnetic coating 2 is formed by a uniform layer of magnetic oxide particles in a polymeric binder. The coating 2 may have a thickness of between 300 and 1000 microinches but is preferably 400 to 700 microinches thick. Any suitable method can be used to form the magnetic coating 2 on the substrate 1; for example, the magnetic oxide particles may be contained in a settable liquid binder (for example, a polyurethane binder) which includes a volatile solvent (for example, tetrahydrofuran or cyclohexanone), the liquid binder being first applied to the substrate and subsequently set by heating or by air-flow drying to drive off the volatile solvent. The liquid binder may contain small amounts of diluents such as, for example, ketones, esters and aromatic hydrocarbons. Before setting of the binder the magnetic oxide particles will, in general, by aligned in a common direction using an external magnetic field. The formed magnetic coating 2 is flexible. Although the substrate 1 is illustrated as only coated on one side with the coating 2, both sides of the substrate 2 can be so coated if desired.

The masking coating 3 is applied on top of the magnetic coating 2 subsequent to the formation of the coating 2 on the substrate 1. The layer 4 of the masking coating 3 is sufficiently thick to mask the magnetic

coating 2 which is generally brown in colour. The layer 4 is preferably a white (or other suitable colour) opaque layer and, for example, is formed by applying a settable liquid binder comprising a volatile solvent, a binder and a white pigment (such as, for example, titanium dioxide) on top of the magnetic coating and then driving off the solvent to leave the white layer 4. The liquid binder used for the layer 4 should be selected to give good adhesion to the magnetic coating 2 while not affecting the uniformity of the magnetic coating. The liquid binder may, for example, contain a binder which is soluble in esters and ketones such as ethyl acetate, butyl acetate, methyl ethyl ketone and methyl isobutyl ketone; these solvents do not dissolve the magnetic coating 2. In general, the layer 4 may be arranged so as not to attack the magnetic coating 2 by providing that (a) the binder systems of the coating 2 and the layer 4 are the same or similar and have similar solubilities except that the coating 2 has been insolubilised by the addition of a crosslinking agent, or (b) the coating 2 contains a binder system which is not affected by the solvents of the layer 4. In either case the layer 4 may or may not also be crosslinked.

The layer 4 is flexible and can be written or printed upon in an optically readable manner.

Both the magnetic coating 2 and the masking coating 3 can be applied by precision coating techniques such as, for example, extrusion, gravure, reverse roll, meyer bar or doctor blade.

The protective layer 5, the presence of which is optional, is applied on top of the masking coating and is preferably a flexible, clear, protective coating.

The total thickness of the masking coating 3 should be such as to avoid difficulty in detecting information magnetically stored in the coating 2 as a result of the coating 2 being spaced from a magnetic pick-up head by the thickness of the coating 3. Thus, the total thickness of the masking coating should not (a) be so thick as to prevent the effective recording and replaying of magnetic information becuase of a too large separation between the magnetic recording head and the magnetic coating 2 nor (b) so thin that the magnetic coating 2 clearly shows through the masking coating 3. The coating 3 may have a thickness of between 300 and 1,500 microinches but is preferably 400 to 700 microinches thick.

Information can be stored on the storage medium in two forms, firstly in an optically-readable form by writing or printing either directly on the masking layer 4, or (as in the illustrated storage medium) on the protective layer 5, and secondly in a magnetically-readable form on magnetic coating 2. The surface texture of the masking coating 3 may, for example, be arranged to be suitable for printing upon and/or to be written on without difficulty by ball-point pen, ink or graphite. Information can be stored in the coating 2 by any suitable magnetic recording method and can be replayed, erased and updated a number of times.

The information-storage medium described can be handled as an ordinary paper sheet and can thus be advantageously used in security printing to facilitate automatic accounting and security checking.

WHAT WE CLAIM IS:-

1. An information-storage medium, comprising a sheet of paper, a magnetic coating formed over the whole of one surface of the paper sheet, and a masking coating formed over the whole of one surface of the magnetic coating, the magnetic coating and masking coating respectively serving to store information in a magnetically readable and an optically readable manner.

2. A medium according to claim 1, in which the masking coating comprises an opaque layer.

3. An information-storage medium, comprising a sheet of paper, a magnetic coating formed over the whole of one surface of the paper sheet for magnetically storing information, and an opaque masking coating formed over the whole of one surface of the magnetic coating, the magnetic coating and the masking coating being formed by layers which have been successively applied to the paper sheet.

4. A medium according to claim 3, in which the opaque masking coating is adapted to receive and display optically readable printing thereupon.

5. A medium according to any preceding claim, in which the masking coating has a protective covering material.

6. A method of producing an information-storage medium, comprising the steps of coating magnetic particles in a settable liquid binder onto a sheet of paper, setting the binder to form a solid, flexible, magnetic coating over the whole of one surface of the paper sheet, and applying a flexible, opaque, masking coating over the whole of one surface of the magnetic coating.

7. A method according to claim 6, in which the masking coating is applied in a settable liquid binder, the two said binders being substantially similar except that the

binder of the magnetic particles has been insolubilised.

8. An information-storage medium substantially as described with reference to the accompanying drawing.

9. A method according to claim 6 and substantially as descibed with reference to the accompanying drawings.

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Printed for Her Majesty's Stationery Office,
by Croydon Printing Company Limited, Croydon, Surrey, 1980.
Published by The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*